(12) UK Patent Application (19) GB (11) 2 258 637 (13) A

(43) Date of A publication 17.02.1993

(21) Application No 9209802.9

(22) Date of filing 07.05.1992

(30) Priority data
(31) 9109854 (32) 07.05.1991 (33) GB

(71) Applicant
Neopost Limited

(Incorporated in the United Kingdom)

P O Box 3, South Street, Romford, Essex, RM1 2AR, United Kingdom

(72) Inventor
Raymond John Herbert

(74) Agent and/or Address for Service
Hughes Clark & Co
114-118 Southampton Row, London, WC1B 5AA, United Kingdom

(51) INT CL[5]
B41J 7/34 // B41J 1/48, B41K 3/08, G07B 17/00

(52) UK CL (Edition L)
B6F FCR

(56) Documents cited
GB 2150504 A

(58) Field of search
UK CL (Edition K) B6F FCR
INT CL[5] B41J 1/44 1/46 1/48 1/54 7/34, B41K 3/08 3/10, G07B 17/00
Online databases: WPI

(54) Print-wheel setting mechanisms for postage meters

(57) A bidirectional motor is drivingly connected to two (or two series of) print-wheels via respective one way clutches such that rotation of the motor in one direction causes one (or one series) to be set and rotation in the other direction causes the other (or other series) to be set. A series of print-wheels may be a decade-wheel set in which motion is transmitted from a driven (e.g. units) wheel to a further (e.g. tens) wheel by a Geneva or like mechanism.

As described (Fig 3) the motor 49 (which may be in the printhead of a franking machine) drives print-wheels 42_1 and 42_2 via clutch 50 and also drives print-wheels 42_3 and 42_4 via clutch 51. With respect to the series 42_1 and 42_2, the clutch 50 drives a first intermediate gear assembly 47_2-52 of which the wheel 47_2 is fully toothed and the wheel 52 has only one tooth. The wheel 47_2 meshes directly with first print-wheel 42_2, but the other print-wheel 42_1 meshes with an idler wheel 47_1 mounted coaxially on the intermediate gear assembly 47_2-52. Motion is transmitted from the one-toothed wheel 52 to the idler 47_1 by a transfer gear 54 (obscured in Fig 3) journalled on a shaft 55 parallel with but behind motor shaft 48. The print-wheel 42_1 is thereby indexed one digit for each complete revolution of the motor while the print-wheel 42_2 rotates one whole revolution per motor revolution.

In other embodiments there may be two series of printwheels coaxially mounted at axially spaced locations on the motor shaft, each series having its own internal decade mechanism (Fig 2), or the decade mechanism can be dispensed with and two motors may set four printwheels directly with each motor controlling alternate wheels (Fig 1).

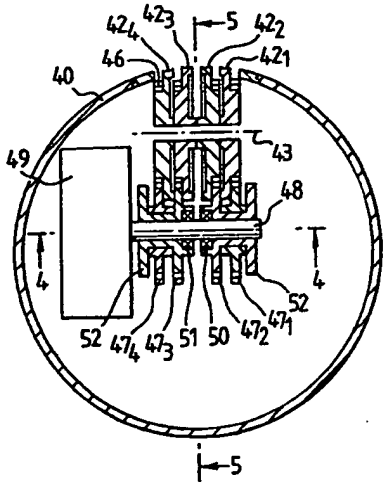

FIG.3

GB 2 258 637 A

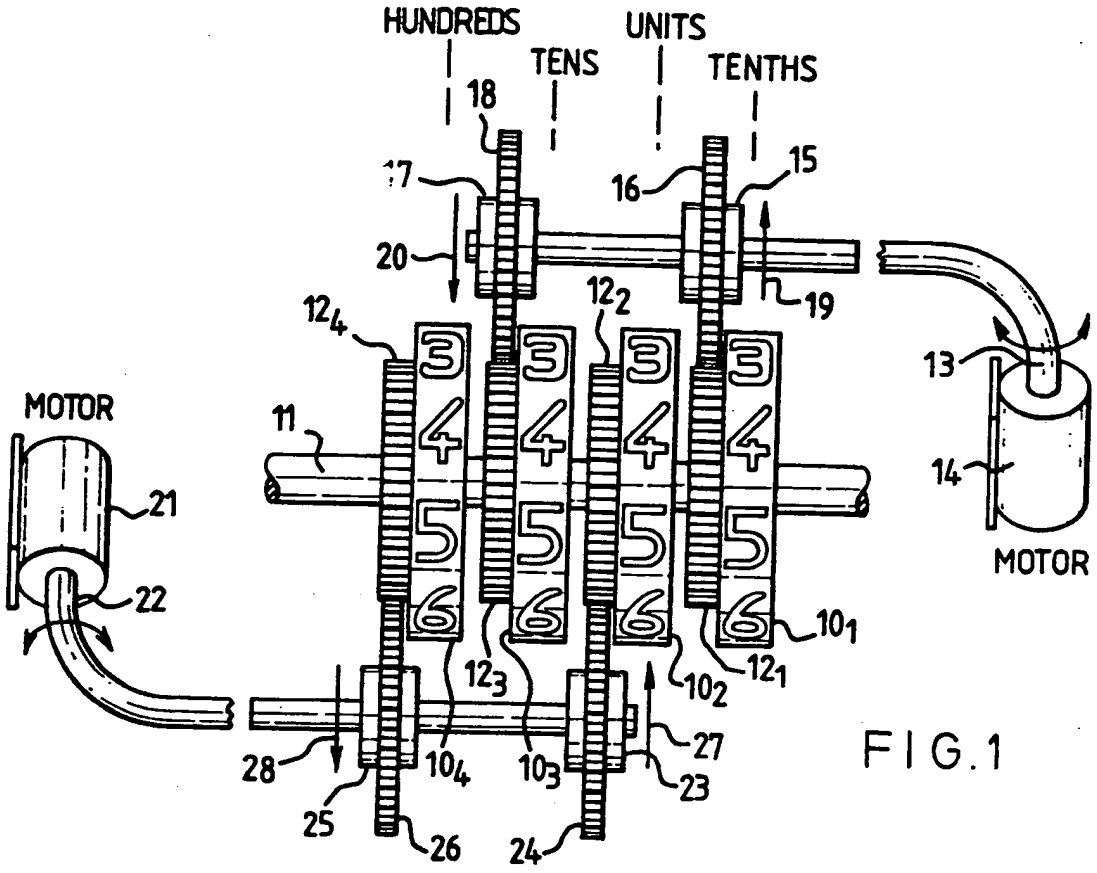
HUNDREDS
TENS
UNITS
TENTHS
MOTOR
MOTOR
18
17
16
15
20
19
13
14
11
21
22
28
25
26
24
27
23

FIG.1

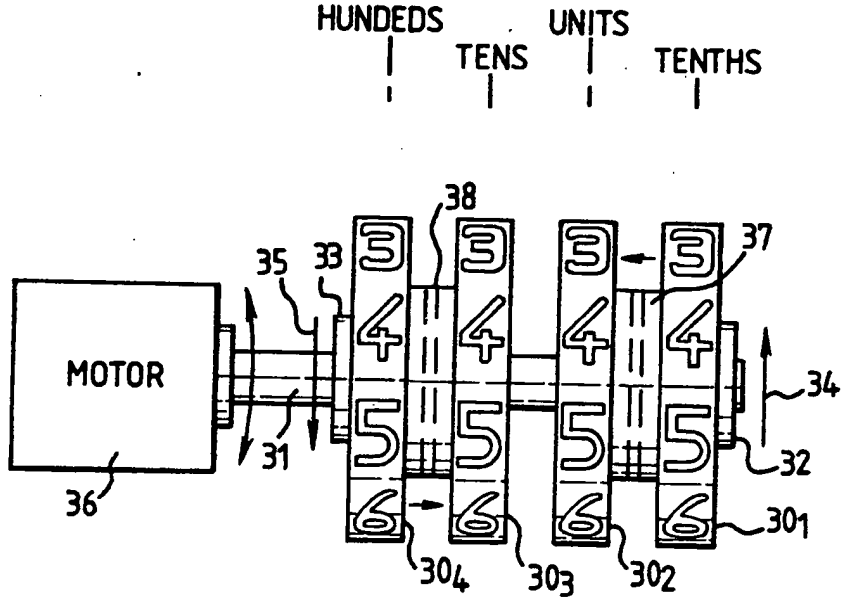
HUNDEDS
TENS
UNITS
TENTHS
MOTOR
38
35
33
37
34
31
32
36

FIG.2

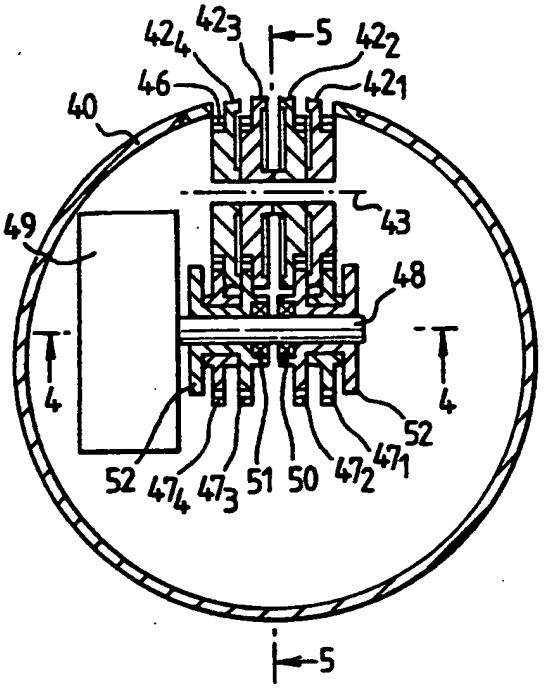

FIG.3

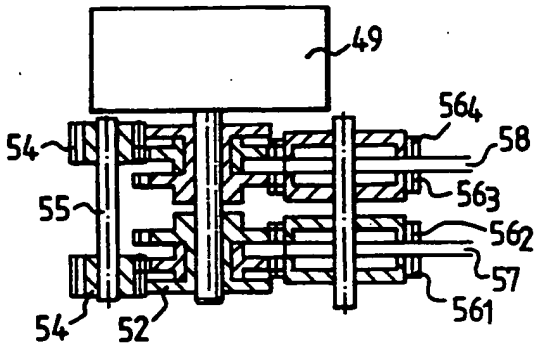

FIG.4

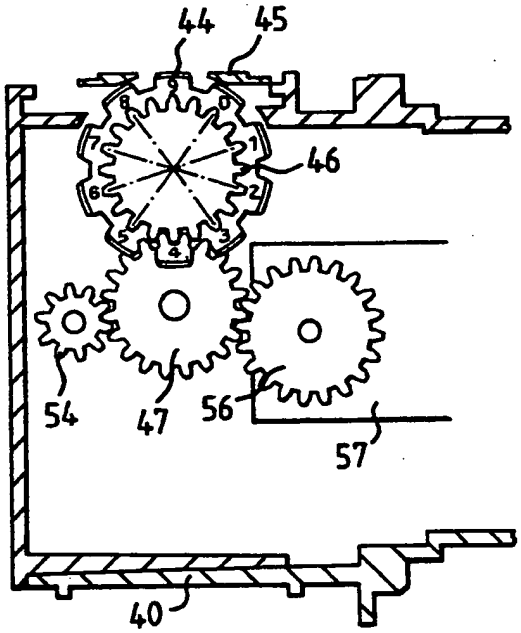

FIG.5

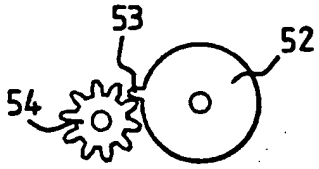

FIG.6

SETTING OF PRINT ELEMENTS IN FRANKING MACHINE

This invention relates to the setting of print elements in a franking machine and in particular to the setting of print wheels utilised for printing postage value in a franking impression.

Known franking machines are provided with a print drum which carries a printing plate for printing a fixed pattern of a franking impression and, if desired, a further printing plate for printing an advertising slogan alongside the franking impression on a mail item. The print drum also carries a group of print wheels having type characters formed on their peripheries for printing a postage value in the franking impression. The print wheels are mounted inside the print drum with the peripheries of the wheels extending through an aperture in the printing plate which prints the fixed pattern of the franking impression such that one type character of each wheel is positioned in the aperture. The print wheels are rotatable about an axis to enable the print wheels to be set to print the digits of a desired postage value. The print drum is carried on a rotatable arbor by means of which rotational drive is applied to rotate the print drum through a single revolution to effect printing of the franking impression together with the advertising slogan. Mechanisms coupled to the print wheels are provided to enable a user of the franking machine to set the print wheels to rotational positions required for printing a desired postage value. The mechanisms may be operated by means of levers or thumb wheels connected to the mechanisms but in recent constructions of franking machine the mechanisms are operated by means of electric drive motors. The drive motors are controlled by electronic circuits in dependence upon input of the required postage value by means of manually operated keys of a keyboard. In order to ensure that the print wheels are set correctly to print the required digits of the postage value, the

mechanisms for setting the wheels must be manufactured with precision and as a result are costly to manufacture.

According to one aspect of the invention apparatus for selectively setting first and second rotary elements to selected rotational positions comprises a single bi-directional drive motor; first clutch means coupling the drive motor to said first rotary element, said first clutch means being operative to transmit drive in a first direction of rotation from said drive motor to said first rotary element and inoperative to transmit drive in a second direction of rotation opposite to said first direction of rotation; second clutch means coupling the drive motor to said second rotary element, said second clutch means being operative to transmit drive in said second direction of rotation from said drive motor to said second rotary element and inoperative to transmit drive in said first direction of rotation; and control means operable to energise the drive motor to apply drive in said first direction of rotation via said first clutch means to said first rotary element until said first rotary element is positioned in a first desired rotational position and to energise the drive motor to apply drive in said second direction of rotation via said second clutch means to said second rotary element until said second rotary element is in a second desired rotational position.

According to a second aspect of the invention apparatus for selectively setting each rotary element of a group of at least two pairs of rotary elements to selected rotational positions comprising a first bi-directional drive motor; first clutch means coupling the drive motor to a first one of said rotary elements, said first clutch means being operative to transmit drive in a first direction of rotation from said first drive motor to said first rotary element and inoperative to transmit drive in a second direction of rotation opposite to said first

direction of rotation; second clutch means coupling the first drive motor to a second one of said rotary elements, said second clutch means being operative to transmit drive in said second direction of rotation from said first drive motor to said second rotary element and inoperative to transmit drive in said first direction of rotation; a second bi-directional drive motor; third clutch means coupling the second drive motor to a third one of said rotary elements, said third clutch means being operative to transmit drive in said first direction of rotation from said second drive motor to said third rotary element and inoperative to transmit drive in the second direction of rotation; fourth clutch means coupling the second drive motor to a fourth one of said rotary elements, said fourth clutch means being operative to transmit drive in said second direction of rotation from said second drive motor to said fourth rotary element and inoperative to transmit drive in said first direction of rotation; and control means operable to energise the first drive motor to apply drive in said first direction of rotation via said first clutch means to said first rotary element until said first rotary element is positioned in a first desired rotational position and to energise the first drive motor to apply drive in said second direction of rotation via said second clutch means to said second rotary element until said second rotary element is in a second desired rotational position and said control means being operable to energise the second drive motor to apply drive in said first direction of rotation via said third clutch means to said third rotary element until said third rotary element is positioned in a third desired rotational position and to energise the second drive motor to apply drive in said second direction of rotation via said fourth clutch means to said fourth rotary element until fourth second rotary element is in a fourth desired rotational position.

Embodiments of the invention will now be described by way of example with reference to the drawings in which:-

Figure 1 is an elevation of a four digit print wheel setting drive using two drive motors,

Figure 2 is a similar view of a four digit print wheel setting drive using a single drive motor

Figure 3 is a sectional view on the axis of a print drum illustrating a four digit print wheel setting drive using a single drive motor housed in the print drum,

Figure 4 is a sectional view on line 4 - 4 of Figure 3,

Figure 5 is a sectional view on line 5 - 5 of Figure 3, and

Figure 6 shows a geneva mechanism for the print wheel setting drive.

Referring first to Figure 1, a group of four decade wheels 10_1, 10_2, 10_3, 10_4 are mounted on a shaft 11 and are freely rotatable about the shaft. Each decade wheel carries on its periphery a set of type faces for the digits 0 - 9. The type faces on wheel 10_1 print tenths digits, the type faces on wheel 10_2 print units digits, the type faces on wheel 10_3 print tens digits and the type faces on wheel 10_4 print hundreds digits of the postage value. The decade wheels 10_1 - 10_4 are provided with drive gears 12_1, 12_2, 12_3 and 12_4 respectively. The drive gears are secured to the decade wheels, and may be formed integrally therewith, whereby rotation of the drive gear effects rotation of the decade wheel associated therewith.

A drive shaft 13 of a first bi-directional drive motor 14 is coupled by means of a one way clutch 15 to a transfer gear 16 and by means of a one way clutch 17 to a transfer gear 18. The one way clutch 15 is effective to transfer drive from the drive motor shaft 13 to the transfer gear 16 in a first direction of rotation, indicated by arrow 19, and the one way clutch 17 is effective to transfer drive from the drive motor shaft 13 to the transfer gear

18 in a second direction of rotation, indicated by arrow 20, opposite to the first direction of rotation. The transfer gear 16 meshes with the drive gear 12_1 of the tenths digit decade wheel 10_1 and the transfer gear 18 meshes with the drive gear 12_3 of the tens digit decade wheel 10_3. It will be understood that the one way clutch 15 is capable of transmitting drive only in the first direction of rotation and incapable of transmitting drive in the second direction of rotation. Likewise the one way clutch 17 is capable of transmitting drive only in the second direction of rotation and is incapable of transmitting drive in the first direction of rotation. Accordingly if the motor 14 is energised such as to rotate the drive shaft 13 in the first direction of rotation, drive is transmitted by means of clutch 15 to the transfer gear 16 and thence to the drive gear 12_1 to effect rotation of the decade wheel 10_1. However, if the drive motor 14 is energised such as to rotate the drive shaft 13 in the second direction of rotation, drive is transmitted by means of clutch 17 to the transfer gear 18 and thence to the drive gear 12_3 to effect rotation of the decade wheel 10_3. Setting of the pair of decade wheels 10_1 and 10_3 to required rotational positions is carried out sequentially. First the drive motor is energised for rotation of the shaft 13 in one direction until one decade wheel of the pair is in the required position for that wheel and then the drive motor is energised for rotation of the shaft 13 in the opposite direction until the other decade wheel of the pair is in the required position for that decade wheel.

The other pair of decade wheels 10_2 and 10_4 are set in a similar manner to required rotational positions by means of a second drive motor 21 acting through a similar drive mechanism. A shaft 22 of the drive motor 21 is coupled by means of a one way clutch 23 to a transfer gear 24 and thence to drive gear 12_2 of decade wheel 10_2 to rotate the

decade wheel 10_2 to a required position. The drive motor shaft 22 is coupled by means of a one way clutch 25 to a transfer gear 26 and thence to drive gear 12_4 of decade wheel 10_4 to rotate the decade wheel 10_4 to a required position. The one way clutch 23 is effective to transmit drive only in a first direction, indicated by arrow 27, and the one way clutch 25 is effective to transmit drive only in a second direction, indicated by arrow 28. Accordingly energisation of the drive motor 21 for rotation in one direction transmits drive to one decade wheel of the pair while energisation of the drive motor for rotation in the opposite direction transmits drive to the other decade wheel of the pair.

The drive shafts 13, 22 of motors 14, 21 may be coupled to the one way clutches by rigid shafts with the motors mounted in alignment with the respective axes of the transfer gear wheels or the drive motor shafts may be coupled to the clutches by means of flexible couplings to permit the motors to be mounted in positions other than in alignment with the transfer gear axes.

Although as shown in the drawing one drive motor 14 is utilised to rotate the decade wheels 10_1 and 10_3 and the other drive motor 22 is utilised to rotate the decade wheels 10_2 and 10_4, the drive mechanisms may be modified such that the drive motors rotate pairs of different decade wheels. However where the frequency of setting the decade wheels to required positions is different for the decade wheels it is preferred to pair the wheels in such a manner that one wheel of each pair is relatively frequently set and the other decade wheel of each pair is relatively infrequently set. This arrangement of driving the decade wheels minimises the time required for setting the wheels of a pair.

An indent device (not shown) is provided for each decade

wheel to ensure that the decade wheels remain in their respective positions after setting by the drive motors. Also as is well known in franking machines, a locking mechanism (not shown) is provided to ensure that the decade wheels cannot be moved from their respective set positions upon initiation of a franking cycle, in which the wheels are caused to print a postage value in a franking impression, until after completion of the franking cycle.

As well known in franking machines, electronic circuits are provided to carry out accounting and control operations. The accounting circuits include non-volatile memories providing registers to store accounting data. Where the franking meter operates in a pre-payment mode, one of the registers stores a value of credit available for use in franking mail items. Other registers usually store a tote value which is the accumulated value of postage used in franking, an items count which is the number of items franked and a high items count which is the number of items franked with a postage value exceeding a predetermined value. In order to carry out the accounting operations it is necessary that the accounting circuits receive an input representing the postage value to which the decade wheels have been set for a franking operation. For this purpose, a rotary position encoder (not shown) is provided for each decade wheel. Conveniently the encoders may be located within the corresponding decade wheels. Encoder tracks are provided on the decade wheels and rotate with the wheels. A set of fixed contacts make electrical contact with the tracks as the tracks rotate with movement of the decade wheels. The tracks are so formed that when the wheels are positioned in each of the printing positions in which one of the type faces is able to effect printing, unique interconnections of the fixed contacts by the tracks are provided for each character printing position so that a code representing

the position of the decade wheels is provided to the accounting circuits to which fixed contacts of the encoders are connected. Alternative rotary position encoders may be used to provide signals representing the positions to which the decade wheels have been set. For example the encoders may be resistive, capacitative, hall effect or opto-electric.

Usually the decade printing wheels are not visible to a user of the franking machine and hence it is sometimes desired to provide wheels which carry visible characters on their peripheries to form a display of the postage value to which the decade printing wheels have been set. These additional display wheels (not shown) may incorporate gear wheels which mesh with the drive gears of the decade printing wheels so that as the printing decade wheels are set to positions in which type faces of required digits are in the printing positions, the display wheels are set to display the same digits to the user.

In an alternative construction of decade wheel setting mechanism shown in Figure 2, a single bi-directional drive motor is used to set each of four decade wheels individually. Four decade wheels 30_1, 30_2, 30_3 and 30_4 are mounted to be freely rotatable on a shaft 31. The shaft 31 is coupled by a first one way clutch 32 to one decade wheel 30_1 and by a second one way clutch 33 to another decade wheel 30_4. The clutch 32 is capable of transmitting rotational drive from the shaft 31 to the wheel 30_1 when the shaft 31 is rotated in a first direction indicated by arrow 34 but is incapable of transmitting drive to the wheel 30_1 when the shaft is rotated in a second direction opposite to the first direction. Similarly the clutch 33 is capable of transmitting rotational drive from the shaft 31 to the wheel 30_4 when the shaft 31 is rotated in the second direction indicated by arrow 35 but is incapable of

transmitting drive to the wheel 30_4 when the shaft is rotated in the first direction. A drive shaft of a bi-directional drive motor 36 is coupled to the shaft 31 whereby selective energisation of the motor may be utilised to rotate the shaft 31 in either the first or second direction to thereby set the decade wheels 30_1 or 30_4 to desired rotational positions. Decade wheel 30_2 is coupled to decade wheel 30_1 by means of a drive mechanism 37 such as geneva wheel mechanism whereby rotation of the wheel 30_1 is transmitted to the wheel 30_2. Thus wheels 30_1 and 30_2 are set to their required positions by driving the shaft 31 in the first direction so as to rotate the wheel 30_1 and thereby transmit drive to the wheel 30_2. The drive mechanism 37 requires one revolution of the wheel 30_1 to move the wheel 30_2 from one digit to the next higher digit. Accordingly the wheel 30_1 is rotated through sufficient revolutions to set the wheel 30_2 to the desired digit position and then continued rotation of the shaft 31 is utilised to set the wheel 30_1 to the required digit position. Similarly, wheel 30_3 is coupled to wheel 30_4 by means of a similar mechanism 38 such as a geneva wheel mechanism to receive drive from the wheel 30_4. Rotation of the drive shaft 31 in the second direction is utilised to rotate wheel 30_4 through sufficient revolutions to set the wheel 30_3 to the required digit position and continued rotation of the shaft is then utilised to move the wheel 30_4 to its required digit position. It will be appreciated that the geneva mechanisms 37, 38 transmit drive from one wheel to another wheel only during a small angular movement of the one wheel. As shown in the drawing, the drive to wheels 30_1 and 30_2 is in an ascending direction of the digits and the drive to the wheels 30_4 and 30_3 is in a descending direction of the digits. In general the wheels driven directly by the clutches may be rotated through their digital positions to the required positions without disturbing the setting of the wheels driven by the geneva

mechanisms. However, if the setting of the direct driven wheel 30_1 requires the wheel to move through its zero position, the wheel 30_2 would be incremented. Accordingly if the new tenths digit value to which the wheel 30_1 is to be set is less than the tenths value of the previous setting the units wheel 30_2 is set to n - 1 instead of being set to n, where n is the required digit setting value. Similarly, since the setting of the wheels 30_3 and 30_4 is effected in a decrementing direction, if the setting of the hundreds wheel 30_4 causes it to move through the zero position, i.e. the new value is greater than the old value, the wheel 30_3 must be set initially to n + 1 instead of to n.

While it is convenient to provide the one way clutches to drive the end decade wheels, if desired the construction may be modified by arranging the clutches to drive others of the decade wheels, for example by arranging the clutch 33 to drive wheel 30_3 and the wheel 30_4 being driven through a geneva mechanism from the wheel 30_3. The coupling between the drive shaft of the motor and the shaft 31 may be rigid as shown in the drawing or if desired may be flexible to enable more convenient location of the motor.

Means to ensure retention of the wheels in their respective set positions, locking of the wheels during a franking cycle and encoders to input the set postage value to the electronic accounting circuits are provided as described hereinbefore with reference to the construction shown in Figure 1.

Hereinbefore drive mechanisms have been described for setting print wheels utilised to print a postage value in a franking impression. It will be appreciated that the drive mechanisms may be utilised for setting print wheels utilised to print information other than postage value.

For example the franking impression includes the date at which the franking is printed on a mail item and the date is usually printed by means of settable type wheels carried by a printing member such as the print drum. The wheels for printing the year are infrequently set, and hence the drive mechanism may be utilised to set only those wheels which print the day of the month and the month, the wheels for printing the year being set manually.

The decade wheel setting mechanisms described hereinbefore provide benefit over known setting mechanisms both in cost and size. The compact design permits the entire setting mechanism to be accommodated with the decade wheels within the printing drum of the franking machine thereby eliminating the necessity of providing complex linkages between the print wheels in the drum and the setting devices outside the print drum. A setting mechanism, similar to that described hereinbefore with reference to Figure 2, accommodated within a print drum is illustrated in Figures 3 to 6 to which reference is now made.

Referring to Figure 3 a print drum 40 is rotatable about an axis and carries a group of four print wheels 42_1-42_4 which are rotatable about an axis 43. The print wheels carry on their peripheries type characters 44 and these type characters are brought selectively into printing position by rotation of the print wheels about axis 43. The type characters project through an aperture in a cylindrical wall of the print drum to lie in alignment with a type face on a die 45 for printing fixed format of a franking impression. Each print wheel is formed with gear teeth 46 which mesh with drive gears 47_1-47_4 respectively. Drive gears 47_2 and 47_3 are freely supported on a drive shaft 48 driven by motor 49. Drive gears 47_1 and 47_4 are supported respectively on drive gears 47_2 and 47_3 for rotation relative thereto. A one

way drive device 50 transmits drive from the shaft 48 to the drive gear 47_2 only when the shaft is driven in afirst direction and a one way drive device 51 transmits drive from the shaft to the drive gear 47_3 only when the shaft is driven in a second direction opposite to the first direction. Drive is transmitted from the drive gear 47_2 to the drive gear 47_1 and from the drive gear 47_3 to the drive gear 47_4 by means of geneva mechanisms. The geneva mechanisms each comprise a wheel 52 provided with a single tooth 53 (see Figure 6) secured to the drive gears 47_1 and 47_4. The tooth 53 meshes with a transfer gear wheel 54 which is freely rotatable on a shaft 55 . The teeth of transfer gear wheels 54 mesh respectively with the drive gears 47_1 and 47_4 (see Figures 4 and 5). The arrangement is such that for each rotation of drive gear 47_2 through a complete revolution the geneva mechanism causes the print wheel 42_1 to be rotated by the drive gear 47_1 through an angle to bring the next type character of the wheel into printing position. Similarly each rotation of the drive gear 47_3 through a complete revolution brings the next type character of print wheel 42_4 into printing position. Thus print wheel 42_1 is set by energising the motor 49 to rotate the shaft 48 in the first direction to drive the drive gear 47_2 by means of the one way drive device 50 through a sufficient number of revolutions to cause the geneva mechanism to rotate the drive gear 47_1 and print wheel 42_1 to bring a selected type character on print wheel 42_1 into printing position. Print wheel 42_2 is then set to bring a selected type character thereon into printing position by continued rotation of the drive shaft in the first direction, the extent of the continued rotation being insufficient to cause the geneva mechanism 50 to transmit further drive to the drive gear 47_1. Print wheels 42_3 and 42_4 are set in a similar manner by energising the drive motor 49 to rotate the drive shaft 48 in the second direction. As may be seen from Figure 4 and 5, the drive gears 47_1-47_4 mesh respectively with encoder

wheels 56_1-56_4. Encoder wheels 56_1 and 56_2 co-operate with opposite sides respectively of a printed circuit board 57 and encoder wheels 56_3 and 56_4 co-operate with opposite sides respectively of a printed circuit board 58. The printed circuit boards may carry conductive tracks and the encoder wheels carry contacts which make electrical contact with the conductive tracks to provide electrical output signals representing the rotational positions of the print wheels. Alternatively the printed circuit boards may carry electro-optic devices and the encoder wheels be formed to reflect light such as to generate electrical output signals representing the rotational positions of the print wheels. While the motor is shown aligned with the drive shaft and driving the drive shaft directly, if desired a suitable transmission device, for example a flexible drive, may be provided to permit the motor to be mounted with a different orientation relative to the print wheels and drive gears.

The accommodation of the print wheel setting mechanisms in the print drum enables an overall reduction in the size of the franking machine. The elimination of complex linkages results in cost savings and the need for only one or two motors results in further cost saving as compared with conventional setting mechanisms which utilise a separate motor for each of the four decade wheels and hence require four motors. It will be understood that control circuits are provided to energise the drive motors. The control circuits are responsive to position signals received from the rotary position encoders and to input signals representing the required positions to which the decade wheels are to be set. For example when the decade wheels are to print a postage value, the input signals are derived from an input of a required value of postage to be printed in the franking impression. While the decade printing wheels may be mounted in a print drum which is rotated to effect printing, in general the control

circuits for the drive motors and other parts of the franking machine are stationary and do not rotate with the print drum. Accordingly it will be appreciated that, with the drive motors mounted in the print drum and rotating with the print drum, means such as slip rings will need to be provided to convey electrical signals between those circuits in the stationary part of the machine and the drive motors and encoders in the rotatable print drum. Alternatively if the drive motors are mounted in the stationary part of the franking machine, the drives from the drive motors to the setting mechanisms need to be constructed in such a manner as to permit rotation of the decade wheels with the print drum. For this purpose the drive shafts from the motors may incorporate coupling means which are separated during rotation of the print drum and are brought into coupling engagement when the print drum is at rest in a home position in intervals between print cycles. Interlock means may be provided to ensure correct engagement of the coupling means and correct operation of the setting mechanisms. While the compact construction of decade wheel setting mechanism provided by the invention is particularly beneficial for print mechanisms in which the decade printing wheels are carried in a rotatable print drum, the setting mechanism may be utilised for setting of print wheels in other forms of printing device for example those using a flat bed in which a flat print die defining a fixed pattern is brought into printing position relative to a mail item instead of being rolled against the mail item as in a drum printing device.

While the setting mechanisms described hereinbefore are constructed to set two pairs of decade wheels, it is to be understood that the invention is not limited to the setting of two pairs of decade wheels and if required additional pairs of wheels may be set by similar drive mechanisms.

CLAIMS

1. Apparatus for selectively setting first and second rotary elements to selected rotational positions comprising a single bi-directional drive motor; first clutch means coupling the drive motor to said first rotary element, said first clutch means being operative to transmit drive in a first direction of rotation from said drive motor to said first rotary element and inoperative to transmit drive in a second direction of rotation opposite to said first direction of rotation; second clutch means coupling the drive motor to said second rotary element, said second clutch means being operative to transmit drive in said second direction of rotation from said drive motor to said second rotary element and inoperative to transmit drive in said first direction of rotation; and control means operable to energise the drive motor to apply drive in said first direction of rotation via said first clutch means to said first rotary element until said first rotary element is positioned in a first desired rotational position and to energise the drive motor to apply drive in said second direction of rotation via said second clutch means to said second rotary element until said second rotary element is in a second desired rotational position.

2. Apparatus as claimed in claim 1 including first encoding means coupled to the first rotary element to provide first electrical signals representing the instant rotational position of said first rotary element; second encoding means coupled to the second rotary element to provide second electrical signals representing the instant rotational position of said second rotary element; and wherein the control means is responsive to said first electrical signals when the drive motor is energised to apply drive in the first rotational direction to control energisation of the drive motor to set the first rotary element at the first desired position; and the control

means is responsive to said second electrical signals when the drive motor is energised to apply drive in the second rotational direction to control energisation of the drive motor to set the second rotary element at the second desired position.

3. Apparatus for selectively setting each rotary element of a group of at least two pairs of rotary elements to selected rotational positions comprising a first bi-directional drive motor; first clutch means coupling the drive motor to a first one of said rotary elements, said first clutch means being operative to transmit drive in a first direction of rotation from said first drive motor to said first rotary element and inoperative to transmit drive in a second direction of rotation opposite to said first direction of rotation; second clutch means coupling the first drive motor to a second one of said rotary elements, said second clutch means being operative to transmit drive in said second direction of rotation from said first drive motor to said second rotary element and inoperative to transmit drive in said first direction of rotation; a second bi-directional drive motor; third clutch means coupling the second drive motor to a third one of said rotary elements, said third clutch means being operative to transmit drive in said first direction of rotation from said second drive motor to said third rotary element and inoperative to transmit drive in the second direction of rotation; fourth clutch means coupling the second drive motor to a fourth one of said rotary elements, said fourth clutch means being operative to transmit drive in said second direction of rotation from said second drive motor to said fourth rotary element and inoperative to transmit drive in said first direction of rotation; and control means operable to energise the first drive motor to apply drive in said first direction of rotation via said first clutch means to said first rotary element until said first rotary element is

positioned in a first desired rotational position and to energise the first drive motor to apply drive in said second direction of rotation via said second clutch means to said second rotary element until said second rotary element is in a second desired rotational position and said control means being operable to energise the second drive motor to apply drive in said first direction of rotation via said third clutch means to said third rotary element until said third rotary element is positioned in a third desired rotational position and to energise the second drive motor to apply drive in said second direction of rotation via said fourth clutch means to said fourth rotary element until fourth second rotary element is in a fourth desired rotational position.

4. Apparatus as claimed in claim 3 including encoding means for each rotary element to provide rotational position signals representing the rotational positions of the rotary elements to the control means; said control means being responsive to the position signals to energise the first and second motors to set the rotary elements to the desired rotational positions.

5. Apparatus as claimed in claim 3 or 4 wherein a first pair of the rotary elements require more frequent setting to desired rotational positions than a second pair of the rotary elements and wherein one element of the first pair is coupled to said first drive motor and the other element of said first pair is coupled to the second drive motor.

6. Apparatus as claimed in claim 1 or 2 including a third rotary element coupled to the first rotary element by a first geneva mechanism operative to rotate said third element through a predetermined angle when the first rotary element is moved through a predetermined position by energisation of the drive motor in the first direction of rotation; a fourth rotary element coupled to the second

rotary element by a second geneva mechanism operative to rotate said fourth element through a predetermined angle when the second element is moved through a predetermined position by energisation of the drive motor in the second direction of rotation.

7. Apparatus as claimed in any preceding claim wherein the rotary elements comprise print wheels carrying a group of type characters on the peripheries thereof.

8. Apparatus as claimed in claim 7 wherein the rotary elements, the drive motor or motors and the clutch means are mounted in a print drum; said rotary elements being mounted such that one of the group of type characters on the peripheries thereof project through an aperture in a cylindrical wall of said print drum and said print drum being rotatable about an axis to bring those type characters projecting through the aperture into printing engagement with a print receiving medium.

9. Apparatus as claimed in claim 7 wherein the rotary elements and the clutch means are mounted in a print drum; said rotary elements being mounted such that one of the group of type characters on the peripheries thereof project through an aperture in a cylindrical wall of said print drum; wherein said print drum is rotatable about an axis relative to a stationary member to bring those type characters projecting through the aperture into printing engagement with a print receiving medium and wherein the drive motor or drive motors is mounted on said stationary member and including coupling means between the drive motor or drive motors and the clutch means to transmit drive from the drive motor or drive motors to said clutch means when the print drum is stationary in non-operational position and to permit rotation about said axis of the clutch means relative to the drive motor or drive motors during a print cycle in which the coupling means is

inoperative to transmit drive.

10. Apparatus as claimed in claim 7, 8 or 9 wherein the rotary elements comprise print wheels and at least some of the print wheels are utilised for printing a postage value in a franking impression on a mail item.

11. Apparatus as claimed in claim 7, 8, 9, or 10 wherein the rotary elements comprise print wheels and at least some of the print wheels are utilised for printing a date in a franking impression on a mail item.

12. Apparatus for selectively setting rotary elements to selected rotational positions constructed and arranged to operate substantially as hereinbefore described with reference to Figure 1.

13. Apparatus for selectively setting rotary elements to selected rotational positions constructed and arranged to operate substantially as hereinbefore described with reference to Figure 2.

14. Apparatus for printing franking impressions including print wheels carrying type characters and selectively settable to print variable information in the franking impressions and including apparatus for selectively setting the print wheels as claimed in any preceding claim.

15. Apparatus for printing franking impressions constructed and arranged to operate substantially as hereinbefore described with reference to Figures 3 to 6.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
9209802.9

Relevant Technical fields

(i) UK Cl (Edition K) B6F : FCR

(ii) Int CL (Edition 5) B41J-1/44;1/46;1/48;1/54;7/34
B41K-3/08;3/10 G07B-17/00

Search Examiner
F G MILES

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search
23 JUNE 1992

Documents considered relevant following a search in respect of claims 1, 3

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2150504 A (P.A)	1, 3

up = doc99\fi1000045

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.